

FEB 12 2007

Docket No. 843.43729X00
Serial No. 10/811,973
Office Action dated August 11, 2006

REMARKS

I. Introduction

By the present Amendment, claim 1 has been amended, and claim 10 cancelled. Accordingly, claims 1-6, 9, 11-16, and 19-21 remain pending in the application. Claim 1 is independent.

II. Office Action Summary

In the Office Action of August 11, 2006, claim 1 was objected to because of an informality. Claims 1, 2, 10-13, and 16 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,344,790 issued to Ochi et al. ("Ochi"), in view of U.S. Patent No. 5,532,434 issued to Takeno et al. ("Takeno"). Claims 3, 9, 14, and 15 were rejected under 35 USC § 103(a) as being unpatentable over Ochi in view of U.S. Patent No. 4,042,951 issued to Robinson et al. ("Robinson"). Claims 5 and 21 were rejected under 35 USC §103(a) as being unpatentable over Ochi in view of Robinson, and further in view of U.S. Patent No. 3,723,835 issued to Davis ("Davis"). Claim 6 was rejected under 35 USC §103(a) as being unpatentable over Ochi in view of Davis. Claims 4, 19, and 20 were rejected under 35 USC §103(a) as being unpatentable over Ochi in view of U.S. Patent No. 4,742,377 issued to Einthoven. These rejections are respectfully traversed.

III. Informalities

Claim 1 was objected to because of an informality. Regarding this objection, the Office Action cites an instance of what appears to be a typographical error.

By the present Amendment, Applicants have amended independent claim 1, in part, to address the informality noted in the Office Action.

Docket No. 843.43729X00
Serial No. 10/811,973
Office Action dated August 11, 2006

IV. Rejections under 35 USC §103

Claims 1, 2, 10-13, and 16 were rejected under 35 USC §103(a) as being unpatentable over Ochi in view of Takeno. Regarding this rejection, the Office Action alleges that Ochi discloses a device that includes first and second electrodes having layers containing copper as the main components, a semiconductor element arranged between the two electrodes and electrically connected to the first and second electrodes, as well as a glass ceiling member which seals the first electrode, the semiconductor element and the second electrode. The Office Action indicates that the first and second electrodes include ratios of the layers containing copper as the main components that are not less than 20 wt%. Furthermore, the first and second electrodes are indicated as having copper oxide layers formed on the outer peripheries of the layers containing copper as the main components. The Office Action admits that Ochi fails to disclose the thickness of the copper oxide layers being 1.5 μm or less. Takeno is relied upon for disclosing a copper wire that has a copper oxide layer of 0.1 μm .

As amended, independent claim 1 defines a semiconductor device that comprises:

first and second electrodes having layers containing copper as main components;

a semiconductor element arranged between said first and second electrodes and electrically connected to said first and second electrodes; and

a glass sealing member which seals said first electrode, said semiconductor element, and said second electrode,

wherein, in the first and second electrodes, ratios of the layers containing copper as main components are more than 20 wt% and equal to or less than 25 wt%,

said first and second electrodes have copper oxide layers formed on the outer peripheries of said layers containing copper as

Docket No. 843.43729X00
Serial No. 10/811,973
Office Action dated August 11, 2006

main components, the copper oxide layers contacting with said glass sealing member, and

the thickness of said copper oxide layers is 1.5 μm or less at the time before said first and second electrodes are glass-sealed.

The semiconductor device of independent claim 1 includes first and second electrodes that have layers containing copper as the main components. A semiconductor element is arranged between the first and second electrodes and electrically connected to the first and second electrodes. A glass sealing member is provided to seal the first electrode, the semiconductor element, and the second electrode. Ratios of the layers containing copper as the main components in the first and second electrodes are more than 20 wt%, but less than or equal to 25 wt%. The first and second electrodes have copper oxide layers formed on the outer peripheries of the layers containing copper as main components and the copper oxide layers contacting with the glass sealing member. Furthermore, the thickness of the copper oxide layers is 1.5 μm or less at the time before the first and second electrodes are glass sealed. At least one benefit achieved by the invention of independent claim 1 is that the level of adhesiveness between the glass sealing member and the first and second electrodes can be improved.

Despite the position taken in the Office Action, the cited references do not provide disclosure or suggestion for all the features recited in independent claim 1. Ochi provides a structure wherein a temperature sensitive resistor is sealed in a glass sealing member. The device of Ochi is configured such that the temperature sensitive resistor, or thermistor, is sealed within the glass sealing member and the Dumet wires sandwich and contact the thermistor from both sides. See Fig. 4, column 3, lines 26-33. Ochi provides a Dumet wire that contacts a core wire made

Docket No. 843.43729X00,
Serial No. 10/811,973
Office Action dated August 11, 2006

of an iron-nickel alloy coated by an intermediate layer form of copper. The intermediate layer is further covered by a layer of copper oxide. As further noted in the Office Action, Ochi is completely silent on the thickness of the copper oxide layers. Applicants further note that, as amended, independent claim 1 now requires the ratio of copper content fall within the range of 20-25 wt%.

At the outset, Applicants note that the Office Action appears to misconstrue the specifications provided in JISH4541 as disclosing anything more than a standard for a type of wire. There are numerous professions and industries that publish books of standards that merely define the name given to a particular type of product, device, etc. In this case, the standard in JISH4541 does not equate to guidance for providing features recited in the claimed invention.

Additionally, it appears that Ochi and Takeno are not properly combined to reject the claims. This combination appears to be nothing more than hindsight reconstruction using features recited in the claims as a blueprint. Ochi and Takeno are in entirely different fields of endeavor. Ochi discloses an electronic device that includes a thermistor sealed within a glass sealing member. Takeno discloses a wire including an insulation that can be easily peeled by means of a laser. Additionally, the teachings of Takeno were clearly available to Ochi at the time of filing his application. Nonetheless, Ochi himself was not motivated to seek out the teachings of Takeno to modify his invention for purposes of improvements as alleged in the Office Action. The sole motivation for combining the teachings of Takeno with the device of Ochi appears to be hindsight reconstruction and piece-wise assembly of unrelated references to arrive at the features explicitly recited in the claimed invention. The combination of applied references simply fails to provide disclosure

Docket No. 843.43729X00

Serial No. 10/811,973

Office Action dated August 11, 2006

or suggestion for all the combination of features recited in independent claim 1. In particular, Applicants note the failure by the references to provide features such as:

wherein, in the first and second electrodes, ratios of the layers containing copper as main components are more than 20 wt% and equal to or less than 25 wt%,

said first and second electrodes have copper oxide layers formed on the outer peripheries of said layers containing copper as main components, the copper oxide layers contacting with said glass sealing member, and

the thickness of said copper oxide layers is 1.5 μm or less at the time before said first and second electrodes are glass-sealed.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-6, 9, 11-16, and 19-21 depend, either directly or indirectly, from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

The Office Action also combines Ochi with various other references to sustain rejection of some of the dependent claims. Applicants note, however, that none of the secondary references remedies the failure by Ochi to disclose features recited in the claimed invention.

RECEIVED
CENTRAL FAX CENTER

014/015

FEB 12 2007

Docket No. 843.43729X00

Serial No. 10/811,973

Office Action dated August 11, 2006

V. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

RECEIVED
CENTRAL FAX CENTER

FEB 12 2007

Docket No. 843.43729X00

Serial No. 10/811,973


Office Action dated August 11, 2006

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 843.43729X00).

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP.


Leonid D. Thenor
Registration No. 39,397

LDT/vvr
1300 N. Seventeenth Street
Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666

Dated: February 12, 2007